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## ORIGINAL ARTICLE

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### Chiropractic student attitudes toward team-based learning

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**Objective:** The purpose of this study was to measure chiropractic student attitudes toward team-based learning (TBL) to determine if they are similar to those of medical students and to help clarify existing evidence regarding student perceptions of TBL.

**Method:** Two consecutive cohorts of chiropractic students enrolled in a course that used weekly TBL activities completed an adaptation of the value of teams survey at the end of the term. Chi square analysis was used to assess for differences in scores between the beginning and end of the term.

**Results:** The students did value the TBL process ( $\chi^2 = 75.21, p < .001$ ). Students had a neutral opinion regarding TBL at the start of the term ( $\chi^2 = 30.41, p < .001$ ), but their opinion of TBL improved by the end of the term ( $\chi^2 = 51.66, p < .001$ ).

**Conclusion:** These results were similar to those found in medical education studies. Students tended to value TBL, but they were more receptive to it over time.

**Key Indexing Terms:** Problem-Based Learning; Chiropractic; Education; Team-Based Learning

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### INTRODUCTION

Team-based learning (TBL) is a relatively new learning strategy in health care education and appears to have evolved in response to the movement toward patient-centered health care, as well as to the need to include active learning to better accommodate the needs of adult learners within problem-based curricula. When active instructional innovations are introduced, students do not always recognize their merit, often asserting that traditional instructor-driven methods have greater educational value.<sup>1</sup> Most literature involving TBL is concerned with its effects on learning, with the majority of studies conducted exclusively in medical education. Little attention has been given to student attitudes toward this teaching strategy. Hence, our goal was to measure student attitudes toward TBL in chiropractic education to determine if findings are similar to those in medical education and to help clarify existing evidence regarding student perceptions of TBL. We hypothesize that chiropractic and medical students share the same attitudes toward TBL.

### METHODS

After acquiring institutional review board approval from Palmer College of Chiropractic, we chose 2

consecutive cohorts (56 and 57 students, respectively) of full-time 2nd-year chiropractic students for study. All students were enrolled in an assessment course that covers clinical science knowledge and common musculoskeletal conditions in an integrated and applied manner. We encouraged clinical reasoning and supported the development of patient management skills through the use of case studies, which we incorporated into weekly TBL sessions over the course of the 10-week term.

At the end of the course, we used a modified version of the value of teams survey (Fig. 1) developed by faculty members at the Baylor College of Medicine<sup>2</sup> to measure student attitudes. Their survey measured 2 dimensions of student-perceived value of learning, “working with peers” and “value of group work,” and had internal consistencies of 0.79 and 0.81. The survey consisted of 10 statements scored using a 5-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5), with the higher number indicating greater value. For our study, we eliminated 2 of the original statements, resulting in a total of 8 statements (questions 1–8; Fig. 1) that measured student perception of TBL as it relates to their learning goals and professional development. We treated these as a Likert scale and used Pearson’s  $\chi^2$  ( $5 \times 8$  contingency table) for statistical analysis. Two additional statements (questions 9 and 10; Fig. 1) were added to the original survey to measure how

**Figure 1** - Modified value of teams survey used in this study.

1. The ability to collaborate with my peers will be necessary if I am to be successful as a student.
2. The ability to work with my peers is a valuable skill.
3. Collaborating with my peers will help me be a better student.
4. Solving problems in a group is an effective way to practice what I have learned.
5. Solving problems in a group is an effective way to learn.
6. Working in teams in class is productive and efficient.
7. Group decisions are often better than individual decisions.
8. Solving problems in groups leads to better decisions than solving problems alone.
9. My opinion regarding working in teams at the beginning of the term was poor.
10. My opinion regarding teamwork improved at the conclusion of the term.

student attitudes toward TBL changed over the course of the term. We treated these as separate Likert items and used a  $\chi^2$  goodness-of-fit test for each question for statistical analysis. We conducted all statistics using Minitab 17 statistical software (Minitab, Inc., State College, PA) with  $\alpha$  set at .05.

## RESULTS

All 113 students chose to complete the study, for a response rate of 100%. After satisfying all assumptions, we performed an analysis of variance to determine that there were no significant differences in responses between the 2 cohorts ( $F_{1, 876} = 2.37, p = .124, n = 113$ ). After we pooled the data, we determined that our modified survey had a high internal consistency (Cronbach's  $\alpha = 0.846$ ). Before proceeding with  $\chi^2$  analysis, we added a value of 5 to all cell counts to ensure that there were no zero values. Subsequent analysis revealed that students do value TBL ( $\chi^2_{28} = 75.21, p < .001$ , Cramer's  $V = .132$ ). Goodness-of-fit tests showed that students had a neutral opinion regarding TBL at the start of the term ( $\chi^2_4 = 30.41, p < .001, \Phi = .519$ ), but their opinion of TBL had improved by the end of the term ( $\chi^2_4 = 51.66, p < .001, \Phi = .682$ ). Descriptive statistics are summarized in Table 1.

## DISCUSSION

We found that chiropractic students do value TBL. As indicated by their responses, our students felt that collaborating with their peers to solve problems was an effective way to learn. We also found that the attitude of our chiropractic students toward TBL improved over time. Most students were neutral in their opinions of TBL at the start of the term but had grown to appreciate its value by the end of the term. These findings suggest that the attitudes of chiropractic students toward TBL are similar to the attitudes of medical students in other studies. This comes as no surprise as our chiropractic students, like medical students, were at a point in their education that required critical thinking skills to solve complex clinical problems.

Clinical reasoning skills require time and practice to develop and require higher cognitive ability rather than simple rote memorization of facts. Team-based learning has been shown to be an effective strategy in developing these skills and remains a valuable tool in problem-based health care curricula.<sup>3</sup> Due to its apparent utility with problem solving, TBL has continued to be incorporated into health care education to foster critical thinking and teamwork abilities. Embedded within the TBL model is the constructivist theory. Here, the focus is on the learner rather than the teacher; problem solving plays a key role through the interaction of other learners; and reflection allows learners to rationalize and modify their existing knowledge.<sup>4</sup> Collaboration involves 4 components that are important in explaining the efficacy of TBL in problem-solving processing: motivation, cohesiveness, developmental, and cognitive elaboration.<sup>5</sup> Individual goals are met when the group as a whole achieves its goal, thus the group motivates the individual and functions as a cohesive unit in their common endeavor. When individuals explain subject matter to the group, interaction through discussion and debate fosters intellectual growth and formulation of new ideas, while receiving feedback creates links to prior knowledge. Given the similarities in results between medical and chiropractic students, as well as the similarities within problem-based curricula, we feel confident that TBL is an effective teaching strategy for chiropractic students and their curricula.

**Table 1** - Percentage of Students in Agreement or Disagreement with Survey Statements

Statement	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	Median
1	2%	6%	11%	50%	32%	4
2	0%	1%	1%	40%	59%	5
3	2%	3%	20%	46%	30%	4
4	0%	2%	13%	40%	46%	4
5	1%	3%	14%	43%	39%	4
6	5%	10%	21%	46%	18%	4
7	4%	11%	25%	34%	26%	4
8	3%	5%	16%	42%	35%	4
9	11%	21%	37%	23%	8%	3
10	5%	8%	28%	42%	16%	4

As observed in other studies, an explanation regarding the utility and benefits of TBL, as well as adequate time to realize these benefits, was necessary and key to its successful implementation in our study. Unless students understand how TBL will enhance their development and actually allow them to take more ownership of their learning, they may be unlikely to value its usefulness.<sup>6,7</sup> We also suspect that student attitude toward TBL may be influenced by how effectively an instructor can implement this strategy, especially within the confines of a traditional curriculum. While it may require an initial time investment on the part of the instructor to become proficient in developing and managing his or her own team-based content, TBL ultimately requires less faculty time than most other small-group methods.<sup>3</sup> Considering the many responsibilities of faculty within health care-based fields, TBL appears to be a time-effective strategy that can be easily incorporated into most courses.

## CONCLUSION

Like medical students, chiropractic students value the TBL experience, especially when given adequate time to realize its benefits. Student understanding of the rationale behind TBL, as well as educator experience with TBL, appears to be necessary for its successful implementation. Despite differences in paradigm among the health care professions, the ability to solve complex clinical problems is common to all. Team-based learning appears to be an effective means to this end regardless of the profession.

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## CONFLICTS OF INTEREST

The authors have no conflict of interest to declare and there was no funding for this study.

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### Author Contributions

Concept development: WS. Design: WS, TB. Supervision: WS. Data collection/processing: WS. Analysis/interpretation: AR. Literature search: WS. Writing: WS, AR. Critical review: WS, TB, AR.

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